

TOWN OF LOS GATOS

Geotechnical Report GUIDELINES

I. Purpose

Geotechnical review provides the Town and a property owner the opportunity for thorough review of pertinent geologic and engineering information to determine that a site or structure will be safe from geologic hazards. It also protects the Town and the property owner from potential liability for damage caused by such hazards.

The purpose of these guidelines is to outline necessary elements of geotechnical reports prepared by consultants for submittal to the Town of Los Gatos, as well as the basic steps involved with review during the application process. The Town Geotechnical Consultant is responsible for reviewing and approving both the engineering geologic and geotechnical engineering aspects of proposed development in the Town. These guidelines establish minimum standards for completing geotechnical investigations to expedite the geotechnical review process and to reduce costs to the applicant.

II. Engineering Geology and Geotechnical Engineering

Most construction and development projects in hillside areas or within fault zones in Los Gatos require both an engineering geologic investigation and a geotechnical engineering (soils engineering) investigation. The State of California requires these investigations to be performed to minimum industry standards by professionals with appropriate registration.

The purpose of an engineering geologic investigation is to identify, characterize, and evaluate the earth materials, natural processes, and potential geologic hazards that might affect, or be affected by, development of a specific property. The Town of Los Gatos includes areas with expansive soil and bedrock materials, various forms of existing and potential slope instability (e.g., landslides), surface fault rupture hazards, earthquake ground shaking and earthquake-related ground failure phenomena which require characterization and mitigation to ensure safe development. Other earth-related development constraints (e.g., flooding) may also be applicable to individual sites. A Certified Engineering Geologist (CEG), as defined by the State of California, is the appropriate registration for professionals performing engineering geologic investigations.

The purpose of a geotechnical engineering investigation is to formulate foundation design and grading procedures to ensure long term integrity of new structures and other engineered works (i.e., substantial additions to existing residences, foundation repair, etc.). Recommendations provided by the geotechnical engineer reflect recognition and evaluation of the local conditions as determined by the engineering geologist. Specific

measures may be needed to adequately mitigate or avoid hazards or constraints identified during the engineering geologic investigation. A registered Geotechnical Engineer (GE) is the appropriate registration for professionals performing geotechnical engineering investigations.

The term "geotechnical" used alone (i.e., without the word "engineering" appended) is inclusive of both the disciplines of engineering geology and geotechnical engineering. The Town Geotechnical Consultant is a firm consisting of engineering geologists and geotechnical engineers. As such, the Town Geotechnical Consultant reviews both the engineering geologic and the geotechnical engineering aspects of development.

III. Geologic/Geotechnical Aspects of the Permit Process

Generally, there are three main steps that are involved with geotechnical review of planning, building permit and site development applications. These steps include:

- 1) **Geologic/Geotechnical Investigation and Recommendations** – Geotechnical investigation is required for proposed developments in Los Gatos. A geologic evaluation will be required in addition for most projects located within State Seismic Hazard Zones and Fault Rupture Hazard Zones, landslide areas, and areas of expansive earth materials, and may be required for other projects where the Town determines that site conditions merit such investigation.
- 2) **Geotechnical Field Inspection** – The applicant's geotechnical consultant is required to inspect construction activities and test and approve the geotechnical aspects of construction where applicable. These inspections may include, but are not necessarily restricted to:
 - inspection of site preparation;
 - approval of materials utilized for engineered fill;
 - inspection of excavations for keyways, foundations, retaining walls, surface and subsurface drainage improvements, etc.
 - inspection of engineered fill placement and testing of fill compaction; and
 - inspection of final cut and fill slope conditions and steepness.

Once the project construction inspections and testing have been completed, the geotechnical consultant of record must submit a letter report to the Town which describes modifications (if any) that were made during construction and the 'as-built' conditions of the project. This letter will be reviewed by the Town Engineer and must be approved prior to final inspection and approval of the project.

NOTE: If there is a change in the geotechnical consultant of record, the new consultant must review and concur, in writing, with the 'design-level'

geotechnical report or must present alternative recommendations. The new consultant must assume responsibility, in writing, for all geotechnical aspects of the project.

IV. Geologic Investigations

For sites within State Seismic Hazard Zones and Fault Rupture Hazard Zones, on steep slopes or landslides, and areas of potentially expansive earth materials, evaluation of existing and/or potential geologic hazards of the site must be provided. The geologic investigation should be conducted as a precursor to the geotechnical investigation. At a minimum, geologic investigations should address the following items:

1) Description of Site Conditions

- Distribution of earth materials, including an original engineering Geologic map and cross section(s) showing the distribution of earth materials (soil and colluvium, artificial fill, landslide debris, bedrock, etc.) as mapped across the property and as encountered by subsurface exploration.
- Seismic setting of the subject property, including identification of pertinent regional and local faults and their locations relative to the site described, as well as the potential seismic hazards relating to the site, i.e., ground rupture, ground shaking (seismic design criteria per UBC), liquefaction, lateral spreading, landsliding, etc.
- Slope stability when the development is proposed for steep slopes and/or landslides ; in most cases, a slope stability analysis will be required (see Landslide Repair).
- Potential flood hazard for areas adjacent to existing streams and creeks.
- Surface and subsurface drainage and groundwater conditions, including characterization of drainage channels, springs, or seeps noted on the surface, groundwater levels as indicated by subsurface exploration, etc.

2) Geologic Recommendations

Once the site conditions have been determined, appropriate design recommendations should follow the geologic investigation. These recommendations should address the following:

- General suitability of the proposed land use to geologic conditions, including any areas to be avoided, problems caused by geologic conditions

on adjacent properties, effects of topography and slope, prediction of stability based on geologic factors, effects of groundwater, and recommendations for additional investigations, if necessary.

- Remedial measures necessary to stabilize any areas of unstable slopes, including the potential need for removal and recompaction of non-engineered fill or landslide debris, buttress fills, or retaining walls, drainage control, etc.
- Foundation design considerations where structures would be placed on unstable land, on expansive soils, and/or in areas subject to ground rupture or intense seismic shaking, etc.

3) Landslide Repair Specifications

Thorough evaluation and detailed specifications are required by the Town for proposed landslide repair and/or mitigation. The landslide should be sufficiently explored and tested to properly characterize the surface boundaries of landsliding; the depth of landslide debris; and the presence of underlying colluvial and/or bedrock materials and their engineering strength characteristics. The landslide's surficial and subsurface extent, as well as the adjacent earth materials, should be shown on an original engineering geologic map and cross sections(s).

Illustrations should include the location and logged stratigraphy of the subsurface borings and/or pits. The supporting field and laboratory test results used to determine the earth materials' strength characteristics should be included.

In addition, a slope stability analysis should be conducted to verify that the proposed repairs will produce an acceptable factor of safety. All supporting data, assumed parameters, illustrations depicting the geometry of the analysis and resultant conclusions should be included in the final report submitted to the Town. In general, an analysis method that determines the relative magnitude of ground displacement, if any, is more useful than an analysis that yields a minimum factor of safety.

The proposed repair-grading plans should show in detail (both plan view and cross section) the proposed keyways, retaining walls, and surface and subsurface drainage improvements. The specifications and drawings should be of sufficient detail for field constructions (i.e., specifications for drain pipe, drain rock, filter fabric, cut and fill slopes, etc.)

V. Geotechnical (Soils/Foundation) Investigations

A geotechnical investigation should describe the site's geotechnical conditions and should prescribe appropriate geotechnical recommendations consistent with those conditions. At a minimum, a geotechnical report should address the following items:

1) Description of Site Geotechnical Conditions

- **Distribution of earth materials**, such as soil and colluvium, artificial fill, bedrock, landslide deposits, etc. for both the surface and subsurface. These should be supported by information derived from subsurface exploration. The distribution of any existing fill or landslides with the potential for impacting the proposed project should be illustrated in plan view and cross sections.
- **Surface drainage conditions**, including modifications by subsequent grading, developing drainage channels, etc.
- **Subsurface water conditions**, such as springs or seeps noted on the surface, ground-water levels as indicated by subsurface exploration, etc.
- **Geotechnical engineering characteristics**, including earth material characteristics as determined by field and/or laboratory testing; it is particularly important to determine if artificial fill which predates, but will be utilized for the proposed development, is properly engineered. All test results should be included to document and support geotechnical evaluations.

2) Geotechnical Recommendations

Once the site conditions have been determined, appropriate plan recommendations should follow. These recommendations should address:

- **Site preparation**, including removal of non-engineered fill, organics, landslide debris, plastic or expansive surficial materials, etc.
- **Grading**, including specifications for acceptable artificial fill, proper emplacement of fill materials, i.e., maximum lift thickness, minimum compaction, explanation for proposed keyways and benching, maximum slope steep for cut and fill slopes, etc.
- **Drainage**, including improvements to existing drainage systems or creation of new drainage systems to facilitate dewatering of fill prisms or steep natural slopes, and to avoid ponding of surface water adjacent to residential foundations, etc.
- **Foundation and Retaining Wall Design Parameters**, including appropriate design recommendations with regard to the proposed development, soil strength parameters, slope steepness, seismic setting, etc.

- **Septic drainfield placement**, including recommendations for drainfield placement to minimize the impacts on surface and groundwater quality and to avoid areas of potentially unstable slopes, etc.

VI. Report Preparation

Geologic and geotechnical investigations and reports shall be prepared in accordance with the above guidelines and accepted standards of the geotechnical profession. A Certified Engineering Geologist (CEG) is the appropriate registration for professionals performing engineering geologic investigations. A Registered Geotechnical Engineer (GE) is the appropriate registration for professionals performing geotechnical engineering investigations. Recommendations included in the report and approved by the Town of Los Gatos shall be incorporated in the grading and/or construction plans and specifications.

VII. Town Geology Peer Review Process

For each application, whether it is for a building permit, site development, variance, subdivision, or other planning or building approval, or for strictly geologic review preceding submittal of an application, the Town Geotechnical Consultant generally conducts the following investigate tasks:

- 1) **Geologic/Geotechnical Evaluation** – Once the project reports and plans are reviewed, the relationship between the site conditions and the proposed development is evaluated. This evaluation can be of a preliminary scope for the initial phases of an application (Town maps and a tentative site plan are used), or can be more detailed for the final phases of an application. The review includes an evaluation of the adequacy of the data collected by the project geotechnical consultant as a basis for design recommendations (i.e., mapping, subsurface sampling and laboratory testing) and the appropriateness of the geotechnical recommendations for apparent site conditions.
- 2) **Preparation of Town Peer Review Letter** – Once the above task has been Completed, a review letter is prepared for the Town. This report summarizes the geologic/geotechnical concerns of the Town Geotechnical Consultant for the proposed development. Contents of the letter shall include:
 - Type of development being proposed;
 - Plans and map used in the review process;
 - Geologic and geotechnical conditions identified in the review of the site;
 - Constraints posed by the site conditions;
 - Recommendations of the Town Geotechnical Consultant as to

how to proceed to the next phase of the application process. Geologic/geotechnical recommendations are based on the currently accepted Town policies, land use ordinances, the standard of care of the geotechnical industry, and the professional experience of the Town Geotechnical Consultant.

TOWN OF LOS GATOS

What You Need to Know About GEOTECHNICAL REVIEW

Why does the Town of Los Gatos require geotechnical review?

Building and Grading permit applications typically require an engineering geology and geotechnical engineering report. The geotechnical review is conducted by the Town's Geotechnical Consultant to ensure that geotechnical design recommendations and plans satisfy minimum standards. This review process is required by the State of California for properties within mapped Seismic Hazard Zones and Fault Rupture Hazard Zones. The goal is to reduce the exposure of a site or structure to such hazards, consistent with accepted standards of the geotechnical profession. Geologic hazards generally of concern in the Los Gatos area include earthquakes, landslides and expansive soils.

The geotechnical review involves an independent review of the methods and data used by the applicant's consultant in developing his/her recommendations and conclusions, and a second opinion of whether these recommendations are appropriate for site conditions and the type of proposed project, and consistent with the commonly accepted standards of geotechnical profession. The responsibility for geotechnical aspects of the project remains with the applicant's geotechnical consultant.

When is geotechnical review required?

Geotechnical peer review by the Town is required when any of the following apply:

1. The project is a new home or accessory living structure and is located in one or more of the following areas:
 - Hillside area either as designated in the General Plan or on a site with a slope greater than 20%;
 - State mapped hazard zones;This review may occur at both the planning (feasibility) and building permit (design-level) stages.
2. The project adds bedrooms or habitable space greater than 500 square feet to an existing structure in a mapped State hazard zone, or if on a slope of 20% or greater.
3. The project is a swimming pool or tennis courts on slope greater than 20%.
4. The project will require grading greater than 500 cubic yards or cuts or fills in excess of 4-feet in depth or height.

Peer review may be required in other cases as determined by the Town.

What steps must I follow for geotechnical review?

1. Retain a geotechnical consultant to prepare a geotechnical report, if required, consistent with the "Town of Los Gatos Geotechnical Report Guidelines", available from the Community Development Department and Engineering Division.
2. Submit 2 copies of the report along with plans with a \$1,650 payment (\$1,500 deposit + \$150 administration fee) check issued to the Town of Los Gatos to the Town's Engineering Division.

The deposit is collected to cover charges by the Town Geotechnical Consultant. Any balance remaining in a deposit account after all billing is completed is refundable. In cases where the deposit does not cover the actual cost of services, an additional deposit amount may be required.

3. The Town Geotechnical Consultant will review the report within approximately 10 working days and provide written comments.
4. If significant revisions are required, the Town Engineer and/or Town Geotechnical Consultant will consult, and may meet with you and/or your consultant to provide direction regarding additional work required. Further deposits may be necessary to offset subsequent review costs.

How do I go about hiring a geotechnical consultant?

All engineering geologic and soil's reports must be prepared and signed by qualified professionals.

The appropriate preparer of an engineering geologic report is a Certified Engineering Geologists (CEG). The appropriate preparer of soils engineering report is a registered Civil Engineer experienced in geotechnical engineering (preferably a titled Geotechnical Engineer).

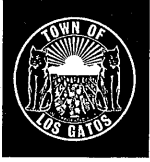
What happens after my geotechnical report is approved?

Your geotechnical consultant of record must certify that the design of your structure or grading permit reflects the recommendations of the geotechnical report(s) by submitting a letter to the Town prior to issuance of your building or grading permit.

Subsequent project construction must be done under geotechnical observation and certified as having been done in conformance with the recommendations made in the report(s). Final inspection and occupancy will not be allowed until such certification (construction observation and testing/ final 'as built' letter) is received.

The plan review and final 'as-built' letters must be prepared by the consultant of record. If there is a change in consultant, the new consultant must concur, in writing, with the recommendations made by the previous consultant or provide alternative recommendations. The new consultant must assume, in writing, responsibility for all geotechnical aspects of the project.

For further information, please contact the Engineering staff at 408- 395-3430.



MEMORANDUM PARKS AND PUBLIC WORKS DEPARTMENT

To: Geotechnical Consultants Practicing in the Town of Los Gatos

From: Kevin Rohani, Town Engineer

Subject: ENFORCEMENT OF STATE OF CALIFORNIA SEISMIC HAZARDS
MAPPING ACT OF 1990

Date: March 25, 2003

As many of you may be aware, the State of California passed the Seismic Hazards Mapping of 1990 in 1991 mandating that liquefaction hazard be determined for new construction. The purpose of the Act is to protect public safety from the effects of strong ground shaking, liquefaction, landslides (or other ground failure), and other hazards caused by earthquakes. The act is a companion and complement to the Alquist-Priolo Earthquake Fault Zoning Act (1972). In addition, since 1994 the Uniform Building Code has provisions requiring the determination of liquefaction potential and mitigation of related hazards. Local regulatory agencies, such as the Town of Los Gatos, are designated by the State to enforce the Act.

This is to inform geotechnical consultants practicing in the Town of Los Gatos that effective with reports submitted to the Town after March 30, 2003, the Town will be enforcing the Act by requiring that liquefaction hazard be determined for new construction in designated areas of potential liquefaction in the Town. Since 1990 the State has been issuing U.S. Geological Survey 7.5' quadrangle maps showing areas of potential liquefaction.

Unless otherwise directed, the methodology, findings and conclusions with respect to liquefaction hazard in the designated areas must be included in the site and project-specific design-level geotechnical report submitted to the Town for review with the permit(s) application.

The Town has not established guidelines for evaluation of liquefaction hazard and at this time does not intend to do so. However, the minimal discussion and conclusion with respect to liquefaction potential and related seismic hazards here-to-for generally provided in geotechnical reports submitted to the Town will no longer be acceptable. Consultants are directed to California Geological Survey (formerly Division of Mines and Geology) Special Publication 117 that presents guidelines for the evaluation of seismic hazards and for recommending mitigation measures. Consultants are also directed to "Liquefaction Evaluation Guidelines for Practicing Engineering and Geological Professionals and Regulators" by Marshall Lew in the November 2001 (Volume VII, Number 4) Environmental & Engineering Geoscience publication (pages 301-320).

Consultants should include sufficient scope and budget in their proposals to clients to allow them to adequately address liquefaction hazards and related seismic hazards for projects in designated areas. Reports submitted to the Town for review that do not adequately address liquefaction hazards and related seismic hazards will be considered to be incomplete, and a copy of this notice may be attached to the review letter sent to the applicant.